NOTES

THE EMPLOYMENT STATISTICS OF THE UNITED STATES EMPLOYMENT SERVICE

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At the beginning of the year 1921 the United States Employment Service commenced the collection and publication of a monthly series of employment statistics as an adjunct to its other employment services. These statistics covered all important manufacturing industries and were obtained from a fixed number of firms in 65 large cities distributed throughout the United States. The data were published both in detail by cities and industry groups and in aggregate, the latter figures being interpreted as an index of employment fluctuation in manufacturing industries for the United States as a whole.

The scope and apparent nature of these figures were such as to raise hope that they would fill the need of such a representative index. The figures were made available shortly after their collection each month and they were much used during the depression period as indicating the course of industrial conditions. Criticism of the figures appeared, however, and in June, 1922, following the appearance of the report for May, their publication was discontinued by the Secretary of Labor with the explanation that this function was one to be reserved to the Bureau of Labor Statistics, a companion bureau in the Department of Labor.[1] In this case the question of whether or not statistics should be collected by the bureau requiring them in the exercise of its other functions or by another, primarily statistical, bureau, is clearly a matter of departmental administration and need not be raised here. The purpose of this article is rather to appraise the results of what has constituted a very extensive experiment in the collection of employment statistics.

In planning for the Employment Service statistics, economy of time in obtaining the data was considered an essential requirement, and in some degree this consideration determined the nature of the figures obtained. This and some other characteristics of the data make it of interest to see to what extent the figures appear to be a valid index of employment during the period for which they are available.

CHARACTER OF THE DATA

The index afforded by these figures is a large-city index, no data having been collected from establishments in rural communities or in

[1] Industrial Employment Information Bulletin, June, 1922.

small cities. It is also a large-establishment index. With one or two exceptions, only establishments employing under good conditions of business over 500 hands were included, and many of those included were excessively large establishments. Thus the total number of employees represented fluctuated around 1,500,000, which is 17 per cent of the total number of wage earners in manufacturing industries according to the census of manufactures for 1919, while the number of establishments was 1,428, or only half of one per cent of the total number of establishments enumerated in the census of 1919.

The figures themselves are described as pay-roll figures. They were obtained, in the largest district (including New York, New Jersey, and Pennsylvania) at least, upon printed schedules, bearing the single question of how many hands were employed on a specified date. These schedules were mailed to each establishment. Paid agents were placed in charge of the collection of the data in each of nine districts, but the information was actually obtained from the establishments in the several cities by unpaid agents, who secured the returns from the establishments and forwarded them to the district agents. The data were tabulated in the offices of the district agents, by cities and by industries, and in this form were telegraphed to the Washington office of the Service.

It is on the point of collection of the data that much criticism has been raised. Objection has been made to the fact that the collecting agents were not statistically trained and that in some districts due care was not exercised in securing authentic pay-roll figures. It is apparently true that there was variation from city to city in the precise method of collecting the figures, and in the case of at least one city the published figures themselves suggest careless or inaccurate returns. But this by no means characterizes the figures as a whole, and they furnish strong internal evidence of essential reliability.

COMPARISON WITH OTHER INDEXES

Examination of the statistics both by comparison with other indexes and by comparison of the trends recorded for the same industries in different cities suggests that the means of collection was for the most part sufficiently sound to give dependable results, and that the large-city, large-establishment index is representative. In the upper section of Diagram 1 the aggregate figures of the Employment Service are compared with those of the New York Industrial Commission for employment in New York State, for the 17 months from January, 1921, through May, 1922. The New York index is to less extent a large-establishment index, and it represents the entire state including the

small cities and other manufacturing communities. Because of the industrial composition of the state, this index has been regarded as a good indication of the course of employment in the United States as a whole. It is clear that the two curves reflect the same general tendencies.[1]

The lower section of the diagram presents the adjusted index of the Harvard Bureau of Economic Research for production in manufacturing industries in the United States. Because this curve has been

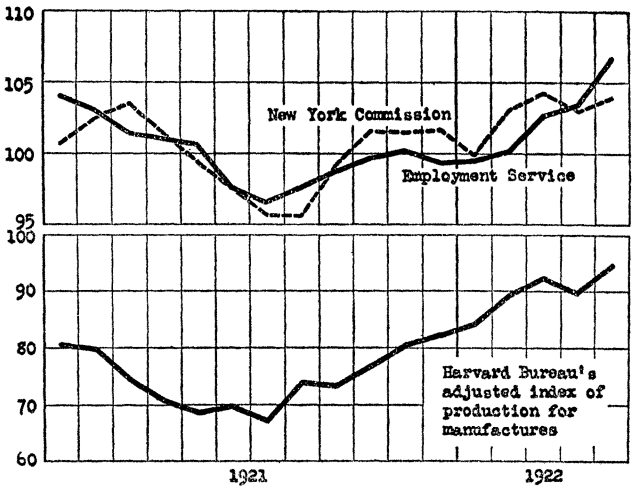

DIAGRAM 1. EMPLOYMENT INDEXES OF THE UNITED STATES EMPLOYMENT SERVICE AND THE NEW YORK INDUSTRIAL COMMISSION, AND ADJUSTED PRODUCTION INDEX OF THE HARVARD BUREAU OF ECONOMIC RESEARCH, JANUARY, 1921, TO MAY, 1922

"corrected" to show only cyclical fluctuation by eliminating other variations, it is not strictly comparable with the "uncorrected" curves above it. It is presented to show that it records the same turning point in the cycle, July, 1921, as does the Employment Service's employment index.

INDEXES FOR INDUSTRIAL AND GEOGRAPHICAL GROUPS

In order to test further the validity of the index, the figures have been broken up in each of the industrial groups into small geographical units. The industrial groups for which the figures are published are

[1] The December figure plotted in the Employment Service curve is not the published figure. The published figure was evidently too low, for a reason which is explained below. The figure here used represents the change registered in December by the aggregate figures minus those for the vehicle industry in the single city, Detroit.

the 14 groups used by the Census Bureau in the census of manufactures. For the present purpose the 65 cities were divided into eight geographically related groups, and curves were drawn for each industry in each of these geographical divisions. Conspicuous similarity was found between the curves for the same industrial groups with certain exceptions. Most of the exceptions were cases in which the curves represented too few employees to constitute a fair sample for the industry. In many cases such curves represented a single establishment or but two or three establishments in a given city. Other exceptions were cases which could be explained either by local industrial conditions, as in the case of the decline in the textile curve for New England due to the textile strike in that section in early 1922, or by the lack of homogeneity in the industrial group itself.

A portion of the composite chart of the curves for each of the 14 industries in each of the geographical divisions is shown in Diagram 2. It presents the curves for "all industries" and for three of the largest industrial groups, "iron and steel and their products," "textiles and their products," and "vehicles for land transportation." The first column of small diagrams is that for all industries. It shows striking differences in the curves for the several geographical divisions. These differences are clearly due to the influence of different industries. In Pennsylvania and Ohio the influence of iron and steel predominates. In New England the effect of iron and steel is balanced by that of textiles. In the North East Central division the vehicle group is sufficiently large to determine the character of the total curve.

The general form of the total iron and steel curve, shown at the bottom of the second column of diagrams, is seen in the iron and steel curve for each geographical division except that for the Pacific states. Here the figures are for few establishments and, in one case, for an establishment apparently undergoing rapid growth. This establishment would have had no effect upon the iron and steel curve for Pennsylvania and Ohio, but it has a controlling influence in the small sample for this industry in the Pacific states.

The textile industry shows similar striking agreement except in the case of the Pacific states, where again the sample is small. In this case the figures for one city, which account for the marked distortion of the curve in August, September, and October, 1921, are given throughout in round numbers, which fact suggests the possibility of inaccurate returns.[1]

The curves for vehicle industries illustrate lack of agreement because

[1] The published figures for the textile group in Los Angeles are: 510, 500, 500, 500, 525, 525, 525, 1,000, 1,000, 1,000, 425, 300, 350, 350, 350, 350, 455.

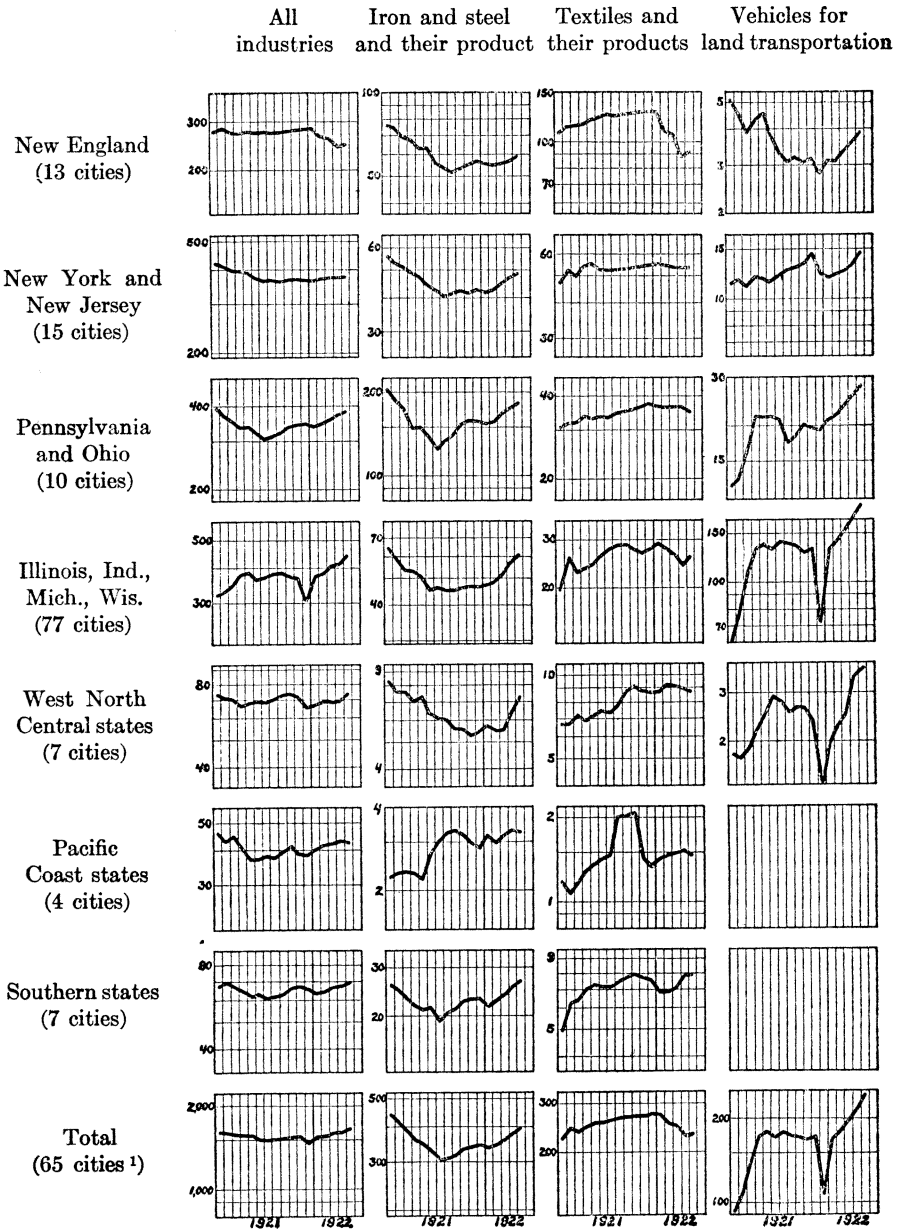

DIAGRAM 2. EMPLOYMENT INDEXES OBTAINED FROM UNITED STATES EMPLOYMENT SERVICE DATA

Scale figures represent thousands of employees. Ratio backgrounds are used to permit direct comparisons between all curves

[1] Including two cities, Denver and Baltimore, not included in the sectional groups.

of difference in the composition of the group. The form of the total curve for vehicles is seen in the vehicle curves for the Pennsylvania and Ohio, North West Central, and North East Central groups, but the vehicle curves for New York and New Jersey and for New England are of different character. In the former case it is evident that the group represents primarily automobile manufacture, while in New York and New Jersey, and particularly in New England, it is probable that other vehicle industries are represented. No establishments in this group are included in the Southern or Pacific Coast cities.

So far as this form of analysis goes, it suggests that the figures obtained offer good indexes for the several industrial groups when these groups are similarly composed in the respective cities.[1] Other industrial groups within which good agreement is shown are: miscellaneous industries, which group probably here, as in the case of the census group itself, contains a large element of electrical machinery; leather; lumber; and paper and printing. In the food, chemicals, and stone-clay-and-glass groups varying employment trends are represented by component industries in each case. It is probable that for the purposes of an employment index changes in the census classification in the case of certain groups could profitably be made.

PERCENTAGE DISTRIBUTION OF WAGE-EARNERS IN EMPLOYMENT SERVICE INDEX AND IN ALL MANUFACTURES

	Employment Service index (average 12 months, 1921)	Census of Manufactures (average 12 months, 1919)	Difference
Textiles and their products	16.4	17.7	−1.3
Iron and steel and their products	22.5	17.4	5.1
Lumber and its manufacture	1.5	9.2	−7.7
Food and kindred products	8.4	7.5	.9
Railroad repair shops	3.9	5.7	−1.8
Paper and printing	3.2	5.6	−2.4
Vehicles for land transportation	9.9	5.5	4.4
Chemicals and allied products	4.8	4.7	.1
Leather and its finished products	3.2	3.9	− .7
Metals and metal products other than iron and steel	4.9	3.7	1.2
Stone, clay, and glass products	.9	3.3	−2.4
Tobacco manufactures	1.9	1.7	.2
Liquors and beverages	.1	.6	− .5
Miscellaneous industries	18.4	13.5	4.9
Total	100.0	100.0	.....

A fault of the index which appears to be of greater importance than the character of the figures themselves or the manner of their collection is the matter of industrial weighting. The accompanying table compares the industry weights in the employment index with the distribu-

[1] It should also be said that similar agreement is shown between these and other employment statistics for the same industrial groups, where similar classification of industries has been used.

tion of wage-earners shown in the census of manufactures for 1919. Iron and steel is excessively represented, as is the miscellaneous group, which resembles iron and steel to some extent. The vehicle group also has too great weight, whereas lumber is seriously underweighted. In view of the difficulty of controlling weights in a fixed-establishment index the differences shown in the table are not entirely surprising, however.

EFFECT OF THE FORD PLANT

It is much less certain that even approximately accurate weights are represented in the aggregate figures for individual cities. Here the disturbing effect of the excessively large establishments becomes evident. This may be illustrated by referring again to Diagram 2. In the case of vehicles in the North East Central section the curve represents about 130,000 employees, most of them contributed by one city, Detroit. A sharp drop is recorded in the vehicle figure for Detroit in December, 1921, which causes the deep depression in the vehicle curve for the section. It is probable that this was not an actual drop in employment but rather an interruption for inventory at the end of the year, since the loss was made up in the January figure. The amount of the drop for vehicles in Detroit was a little less than the number of employees in the Detroit Ford plant, and as practically all departments of this plant were closed for inventory at the end of December and as employment in other vehicle plants in Detroit is not sufficient to account for the drop, it appears that this establishment is accorded influence in the index sufficiently large to control the total curve for the North East Central section and that for the entire vehicle industry. It also accounts for the drop in this month in the aggregate curve for all industries in all cities, which causes the aggregate index to register its lowest point in December, rather than at the turning point of the depression in July. By eliminating the figures for vehicles in Detroit alone, a more representative figure for December is obtained. This was used in the construction of the curve in Diagram 1.

CONCLUSIONS

This analysis of the Employment Service figures is not assumed to be exhaustive. Nevertheless the following conclusions concerning these figures and concerning the larger problem of a representative index for manufacturing industries seem to be justified:

1. It is feasible to collect data for a representative employment index from a large number of cities in a short space of time and to make the figures available within a few days of the date of their collection.

2. The use of non-statistically trained agents is not necessarily a reflection upon the character of the figures.

3. A large-establishment and large-city index, if properly weighted industrially and geographically, is representative of employment trends for the country as a whole.

4. The geographical influence in the case of employment fluctuation is of slight importance compared with the industrial influence.

5. Although large establishments may be considered representative, care should be taken in the composition of an index to avoid excessively large establishments in cases where they alone control the index as a whole, or significant portions of it.

These statistics are no longer published in the bulletin of the Employment Service, but the machinery for their collection is still in operation in 65 cities and the figures are being returned each month for the use of the Employment Service. For the sake of completion of the record of an important period of employment fluctuation it is to be hoped that they may in time be made available to persons outside the Bureau. With minor changes in the list of establishments returning the figures and with only slight supervision of their collection, it appears probable that these statistics might be made to furnish a thoroughly reliable index of employment fluctuation for the country as a whole, and also reliable indexes both for particular industries and for individual cities. The latter service, which is of increasing importance, is one that is not now afforded by any other series of employment statistics.

THE DETERMINATION OF SECULAR TREND RECONSIDERED

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Statisticians will note with pleasure Professor W. L. Crum's discussion of the determination of secular trend in the issue of this Journal for June, 1922. It is one of the welcome signs of the growing interest of mathematicians in the problems with which scientists are struggling in the application of statistical methods in their various fields. The increasing use of statistical methods which economics is experiencing is common to many sciences. In all these sciences progressive workers are finding present knowledge of methods sadly inadequate. The necessity of devoting a large portion of their time to the acquirement of the requisite mathematical knowledge and the development of new and more adequate statistical methods has placed on such workers a heavy burden which is seriously retarding the progress of their work. The